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AMERICAN JOURNAL OF PHOTOGRAPHY

AN ILLUSTRATED MONTHLY,
DEVOTED TO PHOTOGRAPHY
IN ITS WIDEST SENSE

Vol. XIX APRIL, 1899 No. 220

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facilitates printing. Further, the solution does not stain the fingers." With all respect to Dr. Arnold, we cannot endorse his assertion that pyrocatechin renders the plate immune to fog. Its action is almost analagous to metol and it has about the same protective action from fog, from light, upon the immersed plate, and nothing more.

Dispatches from Paris recently received report an important legal victory for the Eastman Kodak Company, in a suit brought against Messrs. Kreguner & Schmand, involving the use of the word "kodak." The interesting feature of the legal battle was the claim of the defendant company that "kodak" had become a general word, and that in using it they only exercised a right which belongs to every manufacturer.

In its decision, however, the Tribunal of Commerce held that the Eastman Company has always used the name, kodak, on its catalogues, and that Dr. Kreguner's contention that the name applies generally to film apparatus is not valid. That, on the contrary, the name of kodak only designates the apparatus manufactured by the plaintiff company, which always carefully pointed out to its customers "that no photographic apparatus is a kodak unless it is manufactured by it and bears its trademark."

The court fixed the damages at 1,500 francs, ordered the publication of the judgment in five Paris and provincial newspapers to be chosen by the plantiff and paid for by the defendant, ordered the defendants to destroy all circulars containing reference to the kodak or the Eastman Company, and ordered the defendants to pay all costs.

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CONVENTION DATES

AND NAME AND ADDRESS OF SECRETARIES

Indiana Convention:

Indianapolis, Ind., February 28th to March 1st.
Secretary, W. O. Nicely, Bloomington, Ind.

Wisconsin Association:

Milwaukee, Wis., March 7th, 8th and 9th.
Secretary, A S. Ralph, Columbus, Wis.

Virginia Association:

Lynchburg, Va., March 22nd, 23rd and 24th.
Secretary, N. V. Lineback, Richmond, Va.

Iowa Convention:

Des Moines, Ia., May.
Secretary, W. O. Reed, Missouri Valley, Ia.

National Association:

Celoron, Chautauqua, July 17th to 22nd.
Secretary, George B. Sperry.

Missouri Convention:

St. Louis, Mo., August 22nd, 23rd and 24th.
Secretary, A. S. Robertson, St. Louis, Mo.

Ohio Association:

Put-In-Bay, O., August 30th and 31st, and September 1st.
Secretary, C. S. Bateham, Norwalk, O.

QUESTION BOX.

Charles F. Lehnder, Mar. 9, 1899.—Which is the best developer?

O, Mr. Lehnder, you should tell us what you wish to develop and we might have more chance of deciding amongst the embarrassment of richness just now in development agents.

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VOL. XIX. APRIL, 1899. No. 220.

FLASH POWDERS

GEORGE RAU

THE sun is not the only source of radiation which produces chemical effect.

Any substance which, when heated intensely, resists all tendency to conversion into vapor or gas—that is, remaining still in a solid condition—will give a continuous spectrum, analagous to that of the sun. It will emit the so-called actinic rays.

There are several bodies which resist the vaporizing power of the intensest heat we are able to produce on earth, though they do yield to the solar heat. Such bodies give a continuous spectrum from the red to the violet.

The carbon points of the electric light are yield a pure white light with the uninterrupted spectrum, and such as is capable of producing chemical action and may be employed in photography.

Incandescent lime, magnesia, zinconia and other substances likewise give forth the chemical light.

It is for this reason that the Welsbach light may also be employed photographically, the mantle being composed of these incandescent earths.

Magnesium metal is especially rich in the blue rays of the spectrum, and though the light it produces when ignited is not so

intense as the electric light, it is still capable of producing in an equal degree photographic action.

There is chemical action in all the rays of the spectrum, but the blue have the preponderance.

The light from magnesium is a beautiful soft light and would form the ideal light for illuminating purposes, but the rapidity of combustion precludes its use, even if it could be made cheap. But for photography nothing is equal to it except, perhaps, aluminum.

Magnesium, when supplied with oxygen, is converted into magnesium oxide—or magnesia, as it is generally called. The burning in air or in oxygen gas is attended with intense heat, which causes the particles of solid magnesia to grow incandescent.

Bunsen estimated the light of incandescent magnesia to be in intensity only $\frac{1}{500}$ of that of the light of the sun, while its actinic or chemical energy is $\frac{1}{18}$ of the sun—that is, the sun's light is 500 times stronger than burning magnesium, but only 36 times stronger in actinism.

To get the whole benefit from the burning metallic magnesium, it will be seen that anything which increases the intensity of the heat will increase the actinic light. The ribbon or wire burns comparatively slow when ignited in the ordinary air, because the supply of oxygen is diluted, but how it glows when burned in a jar of pure oxygen! Hence bodies which quickly and readily supply it with oxygen during its combustion increase its energy.

When the mechanical means were improved for converting the metallic magnesium into a fine powder, it occurred to many to mix it with some oxygen-yielding chemical and so increase its power.

Pure magnesium, without any substance mixed with it, will give photographic effect, but a great deal of its usefulness is lost thereby; though in many cases its power is sufficient, especially when instantaneousness is not desired.

The danger attending the compounding of other chemicals with magnesium has led many to employ it alone, and lamps are in the market for giving a continuous flow of powder to the flame. But there is a risk of recording movements in the photograph—and to get snapshots by its use alone is out of the question.

Messrs. Gaedeke and Miethe, of Germany, some years ago patented the use of magnesium compounds for photography, but no one seems to have introduced their powder to the market, neither

in England nor America, or, as far as I can discover, even in their own country.

Their claims, however, were published in both the English and German photographic journals, and it is surprising to me that no one ever recommended the mixture for efficacy.

The peculiar feature which made their powder different from others was the introduction of amorphous phosphorus in connection with powdered magnesium.

Amongst the many formulæ published, I have not been able to find any mention of the use of this chemical other than in the brief specification published with their patent.

They mention, it is true, amorphous phosphorus combined with magnesium and chlorate of potassa, but I am sure they were well aware of the danger of employing such a violent explosive, which mere friction of stirring with a feather will cause detonation.

Although chlorate of potassa cannot be used, the nitrates of some of the earths, such as baryta or strontia, may be safely employed in combination with magnesium and amorphous phosphorus.

The barium and strontium nitrates are preferable to the alkaline nitrates, as they are less liable to absorb moisture from the air; but even they should be thoroughly dried before mixture, and so should the amorphous phosphorus.

Take 4 ounces of nitrate strontium (dried) and mix it thoroughly with 1 ounce of metallic magnesium in fine powder; this may be done by sieving through a rather fine sieve, which will serve the further purpose of separating any large grains of magnesium, which cause a miniature sky rocket if left in the powder and make a streak across the plate. Instead of using all strontium, one-third barium oxide may be substituted.

To the mixture of baryta, strontia and magnesium add from 50 to 100 grains of amorphous phosphorus. Increase of amount of phosphorus will increase rapidity of the powder, so that if a very rapid powder is desired 120 grains may be used.

The amorphous phosphorus should be added last by way of caution, but I think there is little danger to be feared in the mixing. The powder formed will stand considerable friction and probably is no more liable to explode spontaneously than gunpowder, but even with gunpowder it is well to take care and not presume.

However, let me say here *no compound flash powder should ever be compressed* and ignited in a lamp intended to burn only pure magnesium. Though comparatively safe when ignited unconfined, it becomes a blasting powder like gunpowder when rammed or compressed.

Amorphous phosphorus is sometimes called red phosphorus. It is a modified form of common phosphorus, but entirely unlike it in many respects. It is not poisonous, does not ignite until heated to over 500° F. and is not luminous in the dark.

The drying of the amorphous phosphorus should not be done over a naked flame, and care should be taken to sieve it first through a fine sieve before mixing with the other ingredients.

It will be seen that the use of flash powder is much more economical than the use of pure metallic magnesium, inasmuch as one has five times as much powder for a little extra expense, and then the same quantity of flash powder as magnesium will do more than threefold the work of magnesium.

A slower form of flash powder may be made by omitting the amorphous phosphorus and mixing 5 parts of peroxide barium (dried) with 1 part of magnesium. Portraits may be made with such a mixture, and I would estimate its rapidity at about one second, while that of the amorphous mixture is probably less than one-tenth of a second. This compound may be made as rapid as the above mixtures of baryta and strontium by adding the amorphous phosphorus. It has the advantage of producing less smoke and is entirely free of the unpleasant odor which attends the above mixtures.

Recently I read of a compound which is said to give good light with very little smoke—an objection to most powders. It may be prepared, according to Prof. Alex. Lainer (*Phot. Correspondenz*) by mixing equal parts of magnesium powder and of ammonium nitrate. The ammonium nitrate being somewhat hygroscopic, it is necessary to fuse the salt before its use and to keep it pulverized in a well-stoppered bottle. The powders should be perfectly dry and finely powdered, and then mixed with a feather on a sheet of paper. As to the quantity of the required flash light powder, the author states that he has obtained perfect negatives with plenty of detail in the shadows by using a mixture consisting of 0.3 gramme (about 5 grains) of magnesium powder and 0.3 gramme of ammonium nitrate, the lens being stopped down to

f–7, and the distance of subject from the lens amounting to about six feet. The volume of smoke given off was so small that five subsequent exposures could be made in the room without the least disturbance to the occupants. In taking a photograph of a room of 15 x 15 feet, the author obtained a sufficiently detailed negative by using a mixture of 1 gramme of magnesium powder with 0.8 gramme of ammonium nitrate. The rate of combustion with this new flash light mixture is, perhaps, not quite as rapid as with the above mixtures, but, nevertheless, it is sufficiently quick to enable the operator to photograph by means of it portraits and groups, provided that the constituents of the mixture are perfectly dry and finely powdered and that the mixture is spread over a thin film of guncotton, which may be ignited by means of a taper fastened on a long rod.

I have not tried this smokeless powder, but would here caution anyone not to try to increase its rapidity by addition of amorphous phosphorus unless they make the experiment at first with very minute quantities. I am inclined to think that even the mixture of ammonium nitrate and magnesium should be made with care.

A word about the use of aluminum in flash powders. It might seem astonishing that so slightly oxidisable a metal as aluminum should be made to burn with a very brilliant light. True, in the shape of wire or ribbon it will not burn when placed in the flame of a gas jet, but when the heat is intense it burns with a beautiful light and affords an energy equal to magnesium. It has one advantage over magnesium. Very finely powdered magnesium soon tarnishes and becomes almost useless, so that when the other ingredients of the flash powder are such as attract moisture it is necessary to keep the powder closely protected from damp atmosphere. Fine aluminum powder will keep for years at ordinary temperature without oxidizing. But aluminum powder must be exceedingly finely ground to be of any use photographically. Coarse ground magnesium will ignite without difficulty, but aluminum must be in the form of what is called silver bronze before it will burn with the flame of alcohol or gas.

I have found that about 25 per cent.—that is, one-fourth—aluminum with magnesium, the other components remaining the same, will give an excellent flash powder.

ZONE-PLATE TELESCOPES AND CAMERAS

BY R. W. WOOD.

IN 1875 a very remarkable experiment was performed by the French physicist Soret. He showed that if certain assumptions regarding the wave theory of light were true, a plate of glass in which concentric black circles were described according to a certain law, should have the power of bringing rays of light to a focus, precisely like a lens or burning glass. His calculation showed that he must draw circles of constantly increasing size, the radii being proportional to the square roots of the numbers 1, 2, 3, 4, 5, 6, 7, etc. The alternate rings or spaces between the circles must be blackened or rendered opaque to light in some way, after which the remaining transparent rings would act much as an ordinary condensing lens. As it is necessary to have the rings very small and very accurately constructed, he adopted the method of drawing them on a large scale and then reducing the whole by photography. In this way he produced on a plate scarcely more than an inch in diameter about ninety concentric black rings the whole forming a sort of target. This plate when held between the eye and a distant lamp filled up with light just as a lens does. It could moreover be used as the object glass of a telescope, and in connection with an eye-piece of the usual form yielded enlarged images. But it was not a very efficient substitute for the lens; much of the light was cut off entirely by the black rings and what got through was not all brought to a single focus, for the zone-plate has the remarkable property of having multiple foci. If we move the eye-piece of a zone-plate telescope towards the objective we shall find that there are a number of positions where we can get sharp images, whereas in the case of a lense there is but one. What is still more remarkable, the zone-plate not only acts as a convex lens, but also as a concave lens, causing some of the light to diverge as if coming from a virtual focus behind the plate.

A plate of the Soret type can be made by anyone by simply making a photographic negative of Fig. 1, which is a reduced copy of a drawing made by the writer. This drawing was made with great care, the radius of each of the 230 zones being carefully calculated beforehand. To secure the required accuracy it was necessary to draw the rings on a large scale, and the diameter

of the outer ring in the original is about four feet. The photographic negative should be about the size of a five cent piece, and when held at arm's length between the eye and a distant candle, or better still, a distant arc-light, and the point of light brought into the center of the plate, will fill up with light precisely like a double convex lens.

During the past year the efficiency of the zone-plate has been increased by the writer by devising a form in which the black rings are done away with entirely, the plate being perfectly transparent over its whole extent.

With such a plate a telescope has been made which will show some of the larger lunar craters, and very fair photographs of landscapes have been made, using the plate as a photographic objective. Before going into the nature of the improvement it will be first necessary to consider in an elementary way the theory of the Soret plate.

We know that light spreads out into space from any luminous source in the form of waves like ripples on a pond around the splash of a stone. In the case of light the form of the wave front is a sphere, but if the light source is very distant the sphere is very large and we can consider any small portion of it as flat or plane.

One of the early objections to the wave theory of light was the fact that it moved in straight lines and did not bend around corners, like sound and water waves. The opponents of the theory demanded in other words an explanation of the formation of shadows, and if we grasp the Huygens' theory accounting for the rectilinear propagation of light we shall understand the action of the zone-plate.

Let the arrows in Fig. II. represent rays of light coming from a distant source, then the line ABCD will be a section of the wave front, or the point which the disturbance has reached at the moment under consideration. We will consider the illumination of the point X. We know from experience that we can screen off the whole of the wave except the portion at A without diminishing the illumination of the point X. In other words no light reaches X from B, C, or D, or any other portion of the wave front. Yet we know that the ether at these points is in vibration, and the question is, why are not secondary disturbances sent down along the lines BX, CX and DX, just as they are in the case of sound.

The explanation offered by Huygens is based on the principle of interference, or the circumstance of two waves neutralizing one another at a certain point when they reach that point half a wave length a apart, or in other words, when the crest of one wave and the trough of the other pass the point at the same moment. The distances of B, C, D, and E, from A, have been so taken that each point is half a wave length further from X than the one immediately adjoining, that is, the line CX is half a wave length longer than BX, and BX half a wave length longer than CX.

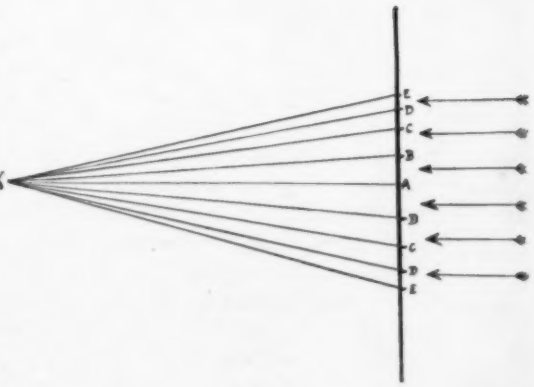


FIG. 2.

Now we know from theory that all points on the wave front or the line ABCD are in the same phase of vibration, that is, if one is just commencing its vibration, all the others are just commencing theirs; if there is a wave crest at one point of the line there is a crest everywhere else. Therefore, the secondary disturbances which we should expect to run down the lines BX, DX, CX, etc., will all start together and travel with equal velocity towards X. But since C is half a wave length further off from X than B, the crest of the wave from C will reach X at the same moment with the trough of the wave from B, and the two will neutralize each other, and the same will be true for waves coming from D and E.

In the figure we have represented the section of the wave front, the spaces BC, CD, etc., being sections of imaginary circular rings drawn about A, which are known as Huygens zones. It is easy to show by geometry that the proper proportion to give these rings, in order that each one may be half a wave length further from X than the one within it is to make their radii proportional to the square roots of the natural numbers.

We have seen that only the light which strikes in the central

circle is effective in illuminating X, since the disturbances which come from the odd rings are destroyed by those coming from the even rings. If now in some way we cut off the alternate rings, then the disturbances reaching X from all others will not be destroyed, and the illumination will be that due to their sum, or, other words, we shall have light coming to X from all that portion of the wave front on which the alternate zones are screened.

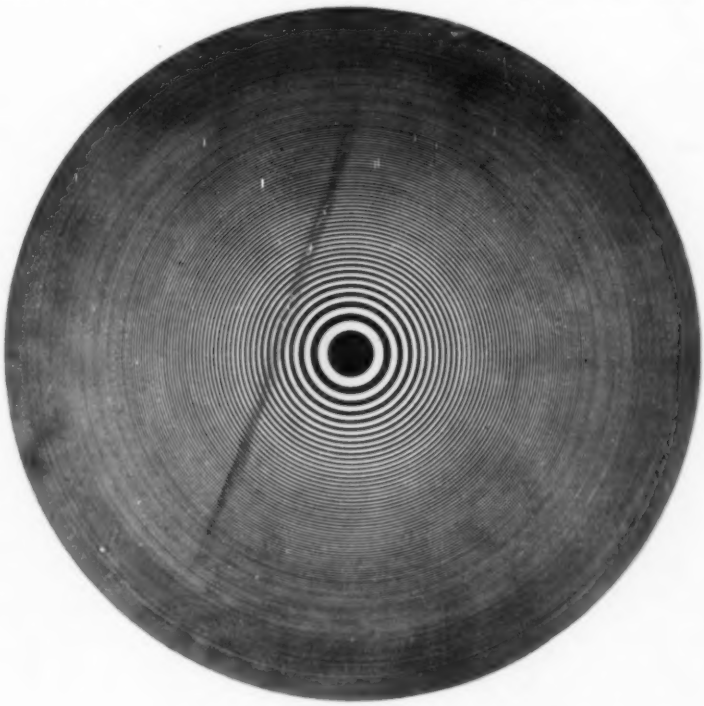


FIG. 1.—ZONE PLATE BY PERMISSION OF PHOTO. TIMES

This screening can be accomplished by executing black rings on glass in the manner already spoken of. The distance of X from the plate is the focal length, aud depends on the size of the rings and the color or wave length of the light.

It has been pointed out by Lord Rayleigh that if it were possible to give the waves falling on the alternate zones a phase-reversal instead of screening them off, a four fold illumination

would be produced at X. In other words if we could make the alternate zones of some transparent substance that would change the crests of the waves into troughs and the troughs into crests, then instead of arriving at X *out of step* with the others, they would arrive in step with them and no longer destroy them, but add to their effect.

This has been accomplished by the writer by making the zones of a thin film of gelatine less than $\frac{1}{10000}$ of an inch in thickness. Through this the light waves move slower than in air and the

Taken with a Zone Plate BY PERMISSION OF PHOTO. TIMES

thickness is such as to retard them exactly one-half wave length on those passing between. The gelatine zones are formed on a plate of glass by a photographic process, and the whole when finished cannot be distinguished from a piece of plain window glass except when held in certain lights when the zones are faintly visible.

The method of preparing the plates together with a somewhat more extended description of their properties has been given in the *London, Edinburgh and Dublin Philosophical Magazine.* The image at the focus is many times brighter than that

formed with a Soret plate and by holding one in front of an arc light a very clear and distinct image of the white hot carbons can be thrown on a wall.

Zone-plates of this type have been made by the writer with focal lengths varying from five inches to seventy feet. If the drawing be reduced to the size of a small pea the focus will be about five inches. To make a plate of this description it is only necessary to photograph the original drawing by means of the minute object lens of a microscope.

By combining a long focus zone-plate with one of these short focus plates we can make a telescope wholly without lenses or mirrors, which will give a fairly distinct image of a very brilliant object, such as an incandescent lamp. Here we use one plate as the object glass and the other as the eye-piece. Now we know that when we use a convex lens as the eye-piece, it must be placed at the focus of the object glass and will give an inverted magnified image, and this is what we find with the zone-plate. If, however, we use a concave lens for the eye-piece we must put it half-way between the objective and its focus, an erect image being the result, and this also we can do with the zone-plate eye-piece, for as I have said before the zone-plate acts at the same time both as a convex and concave lens. Moreover we shall find a number of places at which we can obtain these images corresponding to the different foci of the plate serving the purpose of the object glass so that as we move in the eye-piece tube of the telescope, we get a rapid succession of alternate erect and inverted images.

The large amount of light scattered by the zone-plate owing to its action as a concave lens, together with the multiple foci, made the task of making landscape photographs with one seem rather hopeless. Surprisingly good results were obtained however, with a small camera fitted with a phase-reversal zone-plate of five inches focal length.—*Photographic Times*, New York.

THE AMERICAN JOURNAL OF PHOTOGRAPHY—an old time paper which recently ceased issue—has been resuscitated under the editorship of John Bartlett. Mr. Bartlett stamps his individuality on the first issue, and may be counted on to do his share in firmly refounding the magazine. His name is surety for sound work.—*The Photo-Miniature.*

PHOTOGRAPHING FLOWERS

BY THE EDITOR.

FLOWER photographing demands the same patient observation, from many points of view, as portraiture —a study of individual peculiarities and a conception of the proper angle of illumination and amount of light for rendition of textural values.

A flower, especially a white one, should never have the appearance of marble when presented in a photograph.

Plasticity may be desirable in some subjects, but in flower pictures we must have the similitude of living, diaphanous tissue.

"The Plant and Flower of Light" JOHN BARTLETT

The delicate translucency of the lilies or the mystic interpenetrating light of the rose petal cannot be secured by unmitigated flow of strong light, though it fall from the proper artistic angle.

Beautiful effects of relief, combined with the much-to-be-desired textural translucency, are secured in floral photography better by judicious side lighting. Indeed, side illumination alone is de-

manded by some kinds of flowers, especially those having damascene markings or plications of the petals.

Some striking effects, however, may be had also with top light alone or by reflecting the light upward by means of a mirror.

In the majority of cases it is necessary to support the illumination of the shadowed side of the flowers by reflecting the light from screens, but caution must be taken to keep the reflectors at some distance from the objects, so as to preserve the texture of

Autumn Flowers and Fruits JOHN BARTLETT

the shadows and at the same time give them that semi-transparency which every properly illuminated subject should show in the shadows.

The translucency is entirely imperceptible when the flowers are looked at in certain directions, but by changing the point of view a position will be attained which will exhibit it most beautifully and transform the dull substance into a living glow of splendor.

An inclination of the camera toward the source of illumination will give more or less of the revelation of beauty, and frequently direct pointing of the lens against the light will give novel results.

The background in such cases must be high enough to prevent the rays of light entering the lens, and as an additional security from this danger the lens itself should be shaded.

A subdued light is preferable to a strong one, but one generally needs as much light as is consistent with the photographic demands

Daffodils JOHN BARTLETT

of flowers, since they are such frail, tremulous creatures and prone to droop under even slightly prolonged exposures. Moreover, the light should not be depressed to such a degree as to destroy contrast. A few trials in curtaining off the light with tissue will

demonstrate the effect of proper artistic illumination much clearer than pages of description.

To prevent the drooping of flowers while they are undergoing the ordeal of exposure, insertion of the stems in very wet moss will be found to keep them fresher and firmer than water alone; besides, the moss helps to keep them in position.

In most cases the principal light should come from one direction only, and shadows controlled; but cast shadows and subordinate illuminations will add to the beauty of the picture.

It is worth the while, for the pleasure it gives, aside from the instruction, to watch what marvelous transformation the mode of illumination of a certain kind gives to the most commonplace objects. A piece of unbleached linen, a sheet of white paper, a porter bottle of green glass, an apple, an inkstand, are prosiac enough in themselves, but to the artistic eye, if properly

grouped and properly illumined, furnish a scale of notes which delights the eye with the harmony of the color tones and the subtlety of the lights and shadows.

We are all aware how strikingly a single head, if well painted with the simplest kind of background, will stand out in a gallery of miscellaneous exhibits. The most elaborate work seems weak and ineffective beside it. And why? One word explains everything—simplicity. If distracting elements are introduced, making lights and darks of equal value, they must not compete with each other. There ought to be in every effective picture rich gradations of light and shade. In flowers there is great danger of encountering spotty effects from the similarity of form of the individuals composing the group. This is hardly the place to discourse on the subject of values in art, but I cannot forbear to say a word on the subject, as it has a special bearing on flower work, since the whole effect in picturing them — that is, the standing out of one part from another—is dependent upon the proper perception of the relation of one tone with another.

If all objects were black and white only, like they are to a color-blind person, this sense of judgment of tone would be comparatively easy of cultivation; but the great and almost infinite variety of tones of color in objects, and the additional shades produced by reflection of one color upon another, demand close and accurate sudy of things in their inter-relation to procure harmony of light and shade. Really no object stands isolated. We have our impression of things, optically conveyed, modified by their surroundings; and so it is patent to everyone that haphazard kaleidoscopic association must, in the majority of cases, affect us unpleasantly.

Due consideration must always be taken for the modification produced by juxtaposition of things.

Fortunately, photography has lately given us a better means of rendering color values by orthochromacy, but the process is not yet perfect, and a sort of photographic sense is demanded in association of colors of flowers as to the tone they will receive in the photograph. This acquired seventh specialized sense, which has differentiated in the line of evolution of the photographer, does much for him. Still he has something yet to acquire—the ability of judgment in the use or disuse of the color screen. Nothing is more injudiciously used in photography than this same yellow piece of glass. It has its value—for which let us be thankful—but its constant, indiscriminate employment, "without mitigation or remorse," without any consideration of the subject to be taken, is an abuse of a good thing.

We shall say nothing here of the total destruction of atmospheric effect it causes in landscape, as we are not talking about anything but flowers and we know our failing to digress in devious paths from our main subjeot, but we must say that the color screen, when improperly dyed, depresses the blues inordinately and exalts unnaturally the yellows, giving a shadow or high light in the wrong place and making the whole picture unnatural and sometimes flattening and dulling it.

True, it is of great use when we have variety of colors in the same flower, but judgment, even in such cases, must be used, and the blue should not be depressed further than is necessary to prevent it from being too self-asserting.

By Still Waters F. WILLIAM GEISSE

We have said enough, we trust, too induce photographers to try the delightful paths of floral photography.

We might say something about grouping—that is, arrangement of the flowers in nosegays or clusters—but perhaps Charlotte Bronté is right in not admiring arrangement of various cut flowers in a bunch; and we call to mind a well-written paper by a lady contributor to the *London Amateur Photographer*, who tells us about the everlasting basil pot.

Let us be practical at the end, and say a word about development; which like eloquence in oratory is almost "first, second and last" in photography.

The well-tried plans of floral photographers may go aglee if the plate is inconsiderately developed. Avoid harshness and do not make the negative too intense. Remember, a brilliant negative does not always give a beautiful print.

MARY VAUX

Mr. W. crossing Logan Square, Philadelphia, on Finnish skis the day after the great blizzard. Skis are the snow-shoes used in Scandinavia and Finland to pass over deep snow.

A VISIT TO THE FUR SEAL ISLANDS

BENJAMIN SHARP, M. D., PH. D., *Academy of Natural Sciences, Logan Square, Philadelpnia.*

FROM the surface of Bering Sea rise two volcanic masses. For the greater part of the year, they are enveloped in dense fogs, swept by furious gales, and beaten by the ceasless waves of the ocean. These are the Prebylov Islands—the summer home of the fur seal.

Toward the close of the last century, the sea otter became nearly extinct. The Russian fur hunters had exhausted the

Bachelors LIEUTENANT EMERY

shores of North Eastern Siberia and the islands of the Aleuts, and search for new hunting grounds was undertaken. Prebylov, son of one of the survivors of Bering's crew, hunted for other homes of the otter and fur seal. He had observed the migrating seals in his voyages in the North Pacific Ocean, and knew that they must have some resting place on shores then unknown to man.

After many years he was, in 1786, lead to the islands by the seals themselves, near which he must have often been, during his eighteen years search, among the Aleutian Islands and on the surface of that sea which bore the name of his father's captain. But hidden in the impenetrable fog, he had sailed by, until at last coming by accident nearer than before, he heard the roar of the enormous rookeries booming through the fog.

He tried to keep his discovery a secret, but he was followed

Bachelor Asleep LIEUTENANT EMERY

and in a few years, the islands bearing his name were open to the seal hunters of the north.

To-day, with all the improvements of modern navigation, the steamer finds it difficult, in the presence of dense fogs and heavy gales, to make the islands. In fact our first attempt was unsuccessful. Leaving Unalaska, the principal port of the Aleutian group, about the middle of June, the U. S. Revenue Cutter, "Bear" was headed for the Prebylov Islands. The next morning the southern-most of the two, St. George, was sighted, but

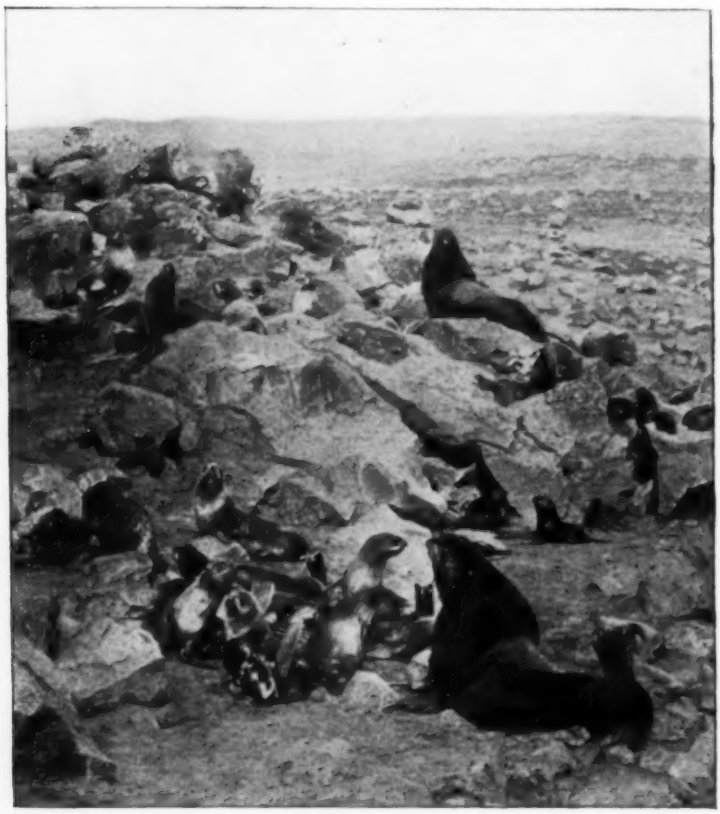
for a moment, in the distance. We caught a glimpse of a long perpendicular cliff, barred with ribbons of glistening white—waterfalls, pouring from the melting snow cap above; then the fog swept in and the land faded out of sight. So dense was the fog, that it was not deemed safe to try to make the land, although

On the Alert BY PERMISSION OF WILLIAM H. RAU

in the afternoon we knew we were near the northern island of St. Paul, as the roar of the seals could be heard on board, nor could we wait for the fog to lift, for days might pass before the islands could be sighted again. We passed on and spent the summer in the Arctic Seas, returning in September to the Prebylov Islands.

It was a clear day when we approached St. Paul, from the

north, and by afternoon we were anchored off the only settlement of the island. The seals were sporting in great numbers in the water about us; four or five would get in line and in graceful curves would follow one another for half a mile or so, giving the effect of a huge black serpent, undulating upon the surface of the



Harem—Bull and Cows BY PERMISSION OF WILLIAM H. RAU

water. No doubt this habit—or may I say game—of the fur seal (also of the porpoise), has lead credulous people to believe in the existence of the fabulous sea-serpent. Again the seals would approach close to the vessel and "treading water" would raise head and shoulders from the surface, and with large wondering

Panorama

J. M. JUSTICE

eyes, gaze at the vessel; then with a hoarse bark, roll over on one side and swim off. One seal was so tame he climbed into a boat, which was made fast to one of the steamers and there spent his nights, coiled up in the stern sheets.

The next morning, bright and clear, we were rowed ashore. As we neared the little cove, protected from the swell by a spur of black volcanic rock, the seals became more numerous, and were smaller than those whose graceful movements we had watched in the long twilight the night before. They were pups and fearless,

Bulls Fighting PROF. BENJ. SHARP

sometimes actually touching, or even jumping over the oars when they dipped into the water. On landing at a small wharf, we walked to the little village, made up of neat white houses and above them all projected the swollen tower of the Greek church.

When the islands were discovered, they were uninhabited by man. Soon however, Aleuts were brought from the islands in the south, to aid the Russians in taking, killing and skinning the seals. They lived in rude mud or sod huts, called Barabaras, which style existed until these islands came, by the Alaskan purchase, into the possession of the United States, who took them

under its direct supervision. They were then leased to the Alaskan Commercial Company for a period of ten years. Among the laws enacted for these seal islands, were those in which the natives received a certain sum for every seal killed on the islands. As the "catch" was about one hundred thousand per year, at that time, money was plenty among the natives. Fine houses were built and furnished, but human-like the money had to be spent and we were informed that in those "good old times," it was no uncommon thing for a native to have two gold watches, one of which had the works torn out and the case used for a tobacco pouch.

No one is allowed to land upon these islands without the Government's permission, and even then the rookeries may not be visited except in company with one of the government inspectors. After a short stay in the government house, I and my two companions, Mr. John M. Justice and Mr. William Hamilton, with the government inspector, started for the rookeries. We soon came upon a long dark sandy beach on the far end of which we could see a number of black objects lying out upon the sand. One of these, which I supposed was a dead seal, lay apart from the others. He was black, lying in an ungainly attitude, and very different from any seal I had ever seen before, the greatest difference being in the long flippers, the greater part of which was covered, as by a mitten, with a smooth polished skin. The inspector assured us that the animal was not dead and touching him, he reared up ferociously and then with surprising activity galloped off to the sea, into which he plunged. Owing to the great length of the limbs, the fur seal is able to lift itself entirely from the ground and can run so rapid that a man would have some difficulty in overtaking him.

We were now upon what is known as a bachelor-rookery, being occupied only by young males of six years or under, and from which rookeries the seals are taken to supply the skins of commerce.

From the bachelor rookery we passed on to the breeding rookery, and saw a beach covered with a mass of moving animals as far as the eye could reach, and the blue water beyond was dotted with thousands of seals sporting in the waves. A most interesting sight was that of the young seals playing in the sea, with apparently all the fun of small boys. These pups, as the

young seals are called, were about two to three feet in length and had just learned to swim. They were born late in June or early in July and for a month were under the care of their mothers. They then "flock by themselves" and establish the so-called pup-rookery near the breeding grounds. When born and for a month after, they are as helpless in the water as a child would be; their heads being so large and so heavy that when falling by accident into the water, they hang head down and would inevitably drown were they not cared for. They learn to swim by experimenting in the surf near the rookery, taking occasional trials in the shallow water, then pulling out on the land to rest, so that after two weeks or more they are able to swim a little in deep water. When we saw them in September, they were fairly good swimmers, although not very strong, they went but short distances from the shores of the rookery. Looking down from the top of a cliff into the bright blue crystal water, hundreds of these little fellows could be seen swimming, rolling over and over, ducking one another with all the enjoyment of exuberant life. Some would come to the smooth rocks, polished by hundreds of generations of seals and finding some little pup occupying a comfortable position in the sun, would unceremoniously shove him off into the water and slip into his place, with a gleam in his eyes that one must take for merriment.

Soon after the time we visited the islands, the seals get ready to migrate to the southward for the winter. They leave in independent squads and spread over the North Pacific Ocean as far south as the 48th or 47th parallel of north latitude, extending from the coast of Japan to that of Oregon. Their exact haunts during this time are not definitely known, but it is supposed that they congregate near and over submarine banks and fishing grounds in order to be near their food, and here they lead a wholly pelagic life, feeding and sleeping on the open sea.

Those born during the past summer are naturally the weaker, and it is estimated that about one half of their number either die or are killed during the first year of their lives. Their natural enemies are sharks and that peculiar wolf of the sea, the Orca or "Killer" whale, some of which have been caught with as many as fourteen young seals in their stomachs.

In the spring of the year, as soon as the ice has left the bleak shores of the islands, the large powerful males, or bulls as they

are called, appear upon the shores of the breeding rookeries. Here they pull out upon the shore, the strongest and most powerful hold those places nearest the water, fighting with all their strength and ferocity for the desired position. Those of less strength are compelled to take positions further back, the weakest and youngest holding those at the back of the rookery, furthest from the shore.

No bull under six years is able to fight his way onto the rookery, and consequently these bachelors are driven from the breeding rookeries and are compelled to establish a rookery of their own—the so-called Bachelor rookeries. It is from these latter that the seals are driven to a position near the village for killing. The natives pass in between them and the sea, herd them together and drive them along towards the killing grounds. Occassionally one or two females are found among them, but on being detected by the experienced eyes of the natives, they are cut out from the herd and allowed to go back to the water.

Having reached the killing grounds, the seals are allowed to cool off, and are then killed by a blow upon the head, skinned and the bodies allowed to enrich the land. The skins are salted and packed, and finally reach the markets in vessels sent from San Francisco to collect them.

The successful males, upon the breeding grounds, after a month of ceaseless fighting, establish themselves with a remarkable regularity upon the sloping shores of the rookery and there await the arrival of the cows. They come about the middle of June, and then another furious struggle ensues for their possession, the strongest and most active bulls collecting around them the largest harems. Here the pups are born and cared for by their mothers and as soon as they are able, the youngsters wander off to a near stretch of sand and there establish their rookery, where they are periodically visited by their mothers, who by some means, are able to distinguish their own young, and never, under any circumstances, do they nurse the young of another.

One visiting the rookeries at this time, will find them mapped out with the regularity of a city, the large males, weighing from four to six hundred pounds and from six and a half to seven feet in length, are surrounded by numbers of smaller females. These weigh not more than from eighty to ninety pounds and measure from four to four and a half feet in length.

Between these groups or harems, as they are called, are avenues of neutral ground, along which the females pass to and from the water where they go for the purpose of feeding. As these animals are voracious fish eaters, and congregated here in enormous numbers, at one time estimated at four and a half millions, the water about the islands, are soon cleared of every edible fish, hence the females and bachelors are compelled to go farther and farther from the land, in ever increasing circles in search of food. In consequence of this the Government has established a limit of sixty miles from the islands, inside of which limit, no pelagic sealing is allowed. As the fur seal is one of the most expert swimmers among mammals, they by no means confine themselves to this distance when in search of food and consequently when beyond the sixty mile limit, fall an easy prey to the hunters in schooners, cruising beyond the government line. As the pups, during the first month or two of their lives, depend upon food derived from their mothers, and as no mother will nurse a stranger's offspring, it follows that every mother killed at sea, causes the death by starvation of the pup upon the shore.

One of the most pitiful sights I ever witnessed, was that of the pup-rookery as we saw it at the time of our visit to the islands. It is a broad sandy beach with pods of little seals scattered between the black polished rocks; many are asleep, others lazily fanning themselves with their grotesque hind flippers, others again waddling toward the water for another swim in the calm sea, which invites them as it laps in a seductive murmur the edge of the beach. Many are fat and sleek, with rich shining skins, but others are thin, with rough tangled fur, their large heads and protruding eyes tell their tale of starvation. Their pitiful cries rend the still air, calling for food and for the mother who will never return—who has been shot at sea, searching for food. These starving pups linger about the rookery, wailing in their hunger and starvation—moaning for food among their well fed companions for a period of a month or more—grow weaker and weaker and at last fall dead, mere skeletons and rot in the sun and fogs upon these black volcanic shores.

ON FOCUSSING

THERE is a class of photographic artists with whom focussing is more honored in the breach than in the observance and whose only trouble seems to be to get the picture in the true artistic out-of-focus condition. While I by no means am of their opinion, I do think that some of the opposite sort to them greatly err in getting their pictures too inartistically sharp all over. Everything with this latter class must be perfectly defined, from foreground to extreme distance, and a picture which will not stand their scrutiny as to sharpness is denounced for savoring of the fuzzy school. My objection to the fuzzy school is that everything is badly defined and there is nothing for the eye to fix itself upon for comparison of distances.

Focussing really is a fine art and something difficult to correctly acquire. I am always in a state of hesitation when I have my hand on the focussing screw. Not that there is any difficulty with our modern deep-cutting lenses to focus on foreground and stop down till the distance is absolutely defined, but there is really no good focus in a photograph where everything is equally sharp. All atmospheric effect is completely destroyed, and atmosphere is as necessary to the artistic existence of the photograph as it is to our animal economy. Yet I have known photographers to put off taking a view because the air was laden with moisture, which beautifully obscured the distance, and have heard them expatiate on the charming effects obtained when every trace of vapor had disappeared and the distance was as sharply defined almost as the foreground.

We have all amused ourselves, when boys, by bending down our heads to the ground and looking through our legs at the landscape. The novelty and abnormal presentation of things delighted us then, but this abnormal presentation of nature is just what the photographer has presented to him on the ground glass when he is trying to make an artistic composition. Despite his experience in contending with inversions, his judgment as to effect is often in the condition of "Alice in a Looking Glass"—yet, perversely, he persists in imposing this condition upon himself in cases where it might be avoided. Did you ever see a professional photographer copying a picture (print or engraving, I mean)? Instead

of inverting the copy so that it may appear right side up on the ground glass, he will focus upon the inverted image.

This inversion of the image on the ground glass prevents us from taking into consideration the scene or subject as a whole, and our distribution of sharp focus is not properly made. Could we see right side up, we would be more apt to notice that our sharpness of a certain plane above another would emphasize some objectionable feature in the picture and mar the whole artistic effect.

Let us quote from a book of instruction for photographers about focussing:

"When it is seen that the subject to be photographed is in the proper position on the ground glass, a larger stop than the one we intend to use should be inserted and the focus taken on the middle distance, and then the smaller stop inserted in its place."

But such general advice will not cover all grounds. On general principles, attention should be centred upon what is most attractive in the picture—and the attractive features are not necessarily always in the foreground. An object that is unsightly in the foreground and which cannot be removed may often be rendered less obtrusive by throwing it out of focus. But then the professional may tell you that you have focussed too far back.

Perfect definition all over all the landscape renders nature too rigid—takes away all idea of mobility from it. We are used to seeing a landscape affected by movement of some kind—actual movement, as the swaying of the foliage by the wind, or the appearance of movement, caused by the diffraction of the atmosphere, which "mocks the eye with air," as Marc Antony puts it—a movement which is translated to the canvas of the painter by trick of art to cheat the imagination and suggest motion.

> "No stir of air was there,
> Not so much life as on a summer's day
> Robs not one light seed from the feathered grass,
> But where the dead leaf fell, there did it rest."

Such a scene is highly poetic, because poetry has a different method from painting of affecting the imagination, but the painter prefers to be swept along with Rubens in a gulf of colors, as herbage, trees and shrubs are whirled, tossed and absorbed by an inundation.

Our knowledge of things greatly influences the impression the

eye receives of them. When we see a familiar object a mile or so away from us, we imagine we see the actual detail and form it presents at only a few feet distance. We even recognize a friend, see his features, "the peculiar trick of his frown," a square or so away, though actually he is only an indistinct spot of color. The recognition of some peculiarity of motion in our friend suggests all the rest to our vision.

Ruskin gives a poetic description of his first sight of a field of blue gentian upon the Alps, which he imagined to be a beautiful translucent sapphire cloud, though, doubtless, to some of us the purple heather of his own country might have seemed an amethyst vapor.

One foggy day, on crossing the ferry, I remember being surprised with what I imagined to be a number of grown-up men playing at leap frog upon the wharf, who proved to be, on our landing, a company of very small boys. The fog had not actually increased the size of the youngsters, but by obscuring the detail made one imagine they needs must be 100 feet or more away, and the eye made allowance for that distance and judged that, if boys, they ought to look much smaller in size.

Of course, aerial perspective in painting is not presented by smudging and blurring; neither is atmosphere in a photograph secured by purposely putting objects out of focus, but by judicious use of the lens and proper focussing so as not to destroy the true appearance of things by concentrating attention upon them, giving them more distinctness and detail than they present either to the eye or to the lens in its normal capacity.

It may be off my subject, but I must say here that, even when judgment is made in the use of lens and in focussing, improper development may destroy all atmosphere in the negative, and, moreover, injudicious use of color screen in orthocromatic photography, by obliterating haze and by rendering distant mountains too definitely, may completely banish every trace of imagination from the view.

"Things out of hope are compassed oft by venturing."

—*Shakspeare.*

REPORT ON PERSULPHATE OF AMMONIA

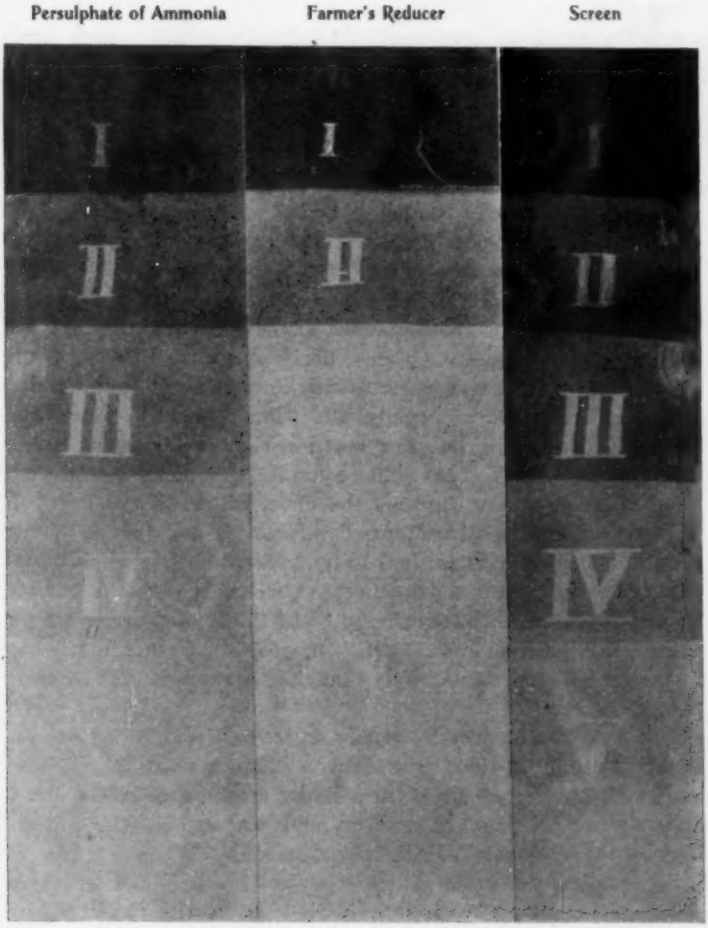
[*Paper presented by Technical Committee of Photographic Society of Phila.*]

I BEG to report on behalf of the Technical Committee that samples of the persulphate of ammonium (Merck's) have been obtained and that your committee has investigated its capabilities as a reducer.

We commenced experimenting with 5% solutions, the strength recommended by Messrs. Lumiere and Sayewictz. This strength we found to be too rapid in its action to permit of easy control, and accordingly gradually reduced it to 1%, which we found perfectly satisfactory. With this strength all the specimens shown to-night, except one, were made, and we recommend any member of the Society who may try this drug to commence with weak solutions until he has become perfectly familiar with its action. We found it to be an efficient reducer and also found the claim of its originators—that it attacks the high lights in preference to the shadows—fully substantiated. With this agent it is possible to bring down an opaque sky to a delicate half-tone without destroying the detail of the shadows—something quite impossible with Farmer's reducer. This remarkable mode of action, combined with cleanliness, ready solubility, ease of arresting (by sodium sulphite) at any desired point, and general simplicity, make it, in the opinion of your committee, by far the best reducer ever proposed.

It must be mentioned, however, that while in all practical particulars the reducer acts exactly as is claimed for it, yet in regard to the theory of its action some modification seems to be required. It will be remembered that the reason ascribed for the greater reducing effects on the high lights is that the persulphate does not dissolve silver when an excess of the reagent is present, so that at the surface of the plate, where such excess is necessarily found, no action takes place. This means that after the deeper strata of the image have been eaten away the action will cease when the superficial layer is reached, and the entire plate will show the same density, although this final density will be very slight. In other words, when the reduction has been pushed to this extreme the plate should present a light, even gray, tone. As a matter of fact, the actual result of thus pushing the reduction is that the originally less dense parts of the image disappear

entirely. In support of this statement we submit a plate, which before reduction was a strong, well-developed negative. As you can all see, there is no image left except a faint trace at



one end, before reduction the densest part. The plate was reduced with a 5% solution, and from this experiment the fact becomes apparent that if the action is allowed to proceed too far any negative will rapidly become a thing of the past.

In order to reach as definite conclusions as possible, we resorted throughout to the plan of photographing a graduated screen, made by pasting successive layers of tracing paper on an 8 x 10 glass plate, the idea being that this would furnish a means of giving different parts of the negatives varying exposures with something like a constant difference and with sharp lines of demarcation, these being the conditions most favorable to accurate comparisons. Of course, the same results could have been obtained more or less perfectly by the common method of putting a plate in a holder and then drawing the slide gradually, giving an exposure for each change of position. But the former plan seemed the more convenient, especially as the consecutive strips on the negative could be automatically numbered by drawing figures on the screen once for all. The screen used was placed in the copying camera and negatives made from it. These were then cut into three longitudinally. One of the pieces in each case was left without further treatment, one was reduced with Farmer's solution, and one with a 1% solution of persulphate. The three strips were then mounted together in the same position they had occupied before cutting the plate. You have before you the specimens so produced, From these plates can be seen the effect of the two reducers on negatives including all ordinary densities. The reduction of the persulphate strip was pushed to far greater lengths than could ever be necessary in actual practice; yet, as will be seen, the delicate tones of these plates have suffered little, if any, and are as strong as in the strip which was not acted on, while the Farmer's strip has lost these half tones so entirely that they are represented by clear glass.

The last two slides which we submit, are particularly instructive. It will be noticed that they show a distinct mottling. These markings are the result of insufficient washing after the hypo and before applying the reducer, and we suggest the following as the rationale of the phenomenon. When a plate is being washed the hypo is more perfectly eliminated at some points than others, owing to variations in the thickness or imperviousness of the gelatine film. Therefore, if the plate is removed from the wash water before it is thoroughly free from the hypo, certain parts will contain more of the salt than others. But it is a fact that when hypo is brought into contact with the persulphate it becomes oxidized at the expense of the

persulphate, which is reduced to ordinary sulphate, an inert body. It is evident, therefore, that where hypo is found the reducing action will be delayed until the oxidizing process is completed, and those parts of the negative which contain little or no hypo will be reduced first. Whether this be the correct explanation or not, the fact remains that only plates which received short washing show the mottling, while those which were well washed in running water are free from it.

Another curious fact was noticed in the course of our work. Several negatives showed, after considerable reduction, gray streaks, which had the appearance of insufficient fixing and which actually were due to this cause, as they were promptly removed by re-immersing the plate in hypo. Yet in each case the plate had originally been allowed to remain in the fixing bath for a considerable time after it looked clear. Apparently, the lessened density of the deposit of metallic silver allowed small traces of the undissolved bromide to be seen which had previously been obscured. The practical precautions, then, to be observed are perfect fixing (preferably in two hopo baths) and perfect washing before applying the reducer. With these precautions, which are really no more than should be done in the case of any valuable negative, failure seems impossible, and your committee feel justified in recommending most heartily this reducer to the members of the Society.

Before closing, we would call attention to one other fact in connection with the persulphate which has not, as far as we have been able to learn, been made public. While its solvent action on metallic silver is vigorous, it does not attack silver bromide. Noting this property, the idea suggested itself that in this drug might be found a convenient means of producing direct positives in the camera. We proceeded as follows: A plate was given a considerable over-exposure, then developed to the back as fully as possible. After a slight wash it was placed in the persulphate bath, this time 10%. The image, instead of the silver bromide, was in this way "fixed" out. The plate was then well washed and brought out into the light, which at once acted on the previously unacted-on silver bromide. This second exposure was then developed, still in daylight. It will be seen that this process is analogous to the old one employing chromic acid, but is less complex. Specimen H shows an exposure treated in this way. The chief

defect appears to be that the sky and other high lights are not clear, and in its present condition the process cannot be regarded as practically useful, though it is not without interest from a theoretical point of view.

CASPAR W. MILLER, *Chairman.*
—Journal Photographic Society of Philadelphia.

CLOUDS IN THE PHOTOGRAPH

[CONCLUDED]

QUITE apart, however, from the angle of light, the character of midday clouds is altogether different from those of evening.

Let us assume that a suitable cloud negative has been secured, and that we are ready for printing operations. To begin we will therefore make a print from the landscape negative, and should the cloudless sky prove too thin to give clear white paper, let us mask it by placing over the sky part a piece of cardboard with the edge nearest the horizon slightly curled so as to prevent any line. When the landscape is sufficiently printed, remove the print from the negative and place the cloud negative in its place. Hold the two up to a feeble light and move the cloud negative into the position desired to give the best effect in the finished picture. Carefully place the two into the printing frame and cover the landscape portion with the cardboard, taking care that the curved edge is beyond the horizon line. If the operation is properly performed it will be seen that the cloud negative is so softened at the horizon that no evidence of the junction will be visible.

A more exact method, if many prints are needed, is to make an exact registration of both cloud and landscape negatives. To do this make a print from the landscape negative, and then in yellow light or in a very dull room proceed to register the cloud negative. Lay it over the print and hold both up to the light. Move the cloud negative about until it occupies the desired position over the landscape. When this has been attained, make a mark on

each side in the margin, both on the cloud negative and the print, exactly where the horizon line comes, to serve as register marks in the after operations. Now lay the marked print back on its own negative as nearly as possible in the correct position, and copy the marks on the print to the same exact spot on the sides of the negatives. A slight lead pencil mark will be sufficient, the object being to know where exactly to place the cloud negative. Make sure that the pencil mark is in the right place and then scratch a small cross with a penknife exactly on the spot, so that it will show in the print. Now carefully, with a sharp pair of scissors, cut out the sky and attach the landscape portion to the wrong side of the cloud negative, taking care that the register marks correspond exactly. If the cloud negative is on paper, lightly fasten it to a piece of plain glass, and in a similar manner attach the cut-out landscape portion to the wrong side as above described. The thickness of the glass helps very much in softening the edges of the junction, and therefore helps to conceal the mechanism.

Put the landscape out to print in the ordinary way, but if the sky is thin and prints gray, a piece of cardboard with the edge slightly curled may be used. Of course, the adjustment must be carefully attended to. When the print is finished lay it with the printed surface upwards on a flat piece of board, and on it place the cloud negative. Make the marks register. In other words, take care that the cloud negative occupies its proper place on the landscape print. Cloud negatives are usually very transparent, and should therefore be printed in very lightly. Remember what has already been said about the unnatural effect of clouds too heavy for the landscape.

Do not leave the printing operation for a minute, or probably the clouds will be overprinted. As the lower portion near the horizon does not require to be so dark as the rest, the curved cardboard may be employed to soften the light at the junction, or it may be gently moved about during the printing operation. As the print cannot be looked at without fear of shifting its position, a little judgment will be needed. Of course, a printing frame can be used so that the print may be watched, but more skill will be required in registering.

Perhaps a better method still is to prepare the cloud and landscape negatives as described above so that each has clearly-defined

registration marks, and the cloud negative has the mask properly secured, so that the part to be occupied by the landscape is protected from the light. Now proceed to print the cloud negative first, so that the exact amount of tone required for the final effect is visable. Remove the print from the frame and substitute the landscape negative. Fit it carefully on to the registration marks and print again. Of course, the sky portion must be carefully covered in addition by cardboard, so that clouds already printed are not degraded in tone. Muddy clouds will never do at any time. By this method perfect harmony can be secured, for the landscape can be printed up to the force of the cloud negative, for it can be examined from time to time until the exact effect has been attained.

By carefully following the instructions given above, success must follow. Of course some failures must be expected at first, but after a very few trials cloud printing will be found by no means a difficult operation.

During the course of some experiments made for this chapter, I tried the effect of separating the sensitive paper from the negative, so as to soften the crude sharpness one too frequently sees. I used a sample of celluloid which had been sent me. It had a matt surface finer than that of the most perfect focussing screen, and therefore seemed exactly fitted for the experiment. I was delighted with the result. The extreme sharpness was slightly blunted, and the artistic gain in consequence was immense. The matt surface is perfect to work upon, either with crayon, stump or pencil, and as a slightly moistened handkerchief at once removed the work, the surface remained uninjured even after many experiments. Shadows may be softened or lights heightened at will, and the most delicate work can be made visible on the print. I do not know if the plain celluloid is kept by the photographic dealers. The sample I used was of about the thickness of a fine visiting card. If it can be obtained I would strongly urge my readers to experiment with it, for I regard it as a new power in the hands of the artistic printer.—*The Practical Photographer.*

THE STOUT SITTERS AND OTHERS

J. R. CUSHING.

ACCIDENTS which tend to mar or impair the beauty of humanity make it almost impossible to expect perfection of form or face in man or woman, and the question naturally arises to what degree personal defects are to be modified or masked that the individuality of the sitter may be preserved and the artistic demands satisfied.

Are we to do as Reynolds did in the picture of Baretti—emphasize the near-sightedness by representing him reading a book a few inches from his eyes? Or are we to flatter our sitters, like Lawrence, who softened positive ugliness to the loss of individuality, thereby complimenting his patron but not acting honestly toward him? We all know the use and abuse of the art of retouching and how it is capable of transferring a Satyr to a Hyperion. We shall not, therefore, touch upon this much-written topic, but shall endeavor to present a few legitimate devices of lighting and posing, by which the flaws of humanity may be toned down so as not to present themselves too obtrusively.

The mode of illumination may minister either to the exaggeration of defects from the normal type or to their subordination so as to be almost imperceptible.

By controlling the blinds of our studios we may, if we feel so disposed, elongate the head of one individual or flatten the face of another.

An operator who understands the principles of his art may, therefore purposely take advantage of such knowledge and employ it to good purpose in obviating the defects in the countenances of his sitters.

People who sit for portraits are not always to blame when they protest against being figured with ungainly mouths, thick lips, flattened noses, high cheek bones or staring eyes.

A portrait illuminated with strong side light makes the head too long, the nose too short, the mouth too small and the eyes too close together, low forehead and pointed chin.

A portrait made in a front top light makes the forehead too broad, the cheek bones too high, with hollow cheeks, the nose flat and the chin broad.

Possessed of these facts, what use can we make of them for homely humanity?

If nature has been liberal in bestowing a large mouth upon a sitter, or parsimonious in the commodity of full cheeks, or blessed him with a flat nose or prominent chin, by a proper method of illumination we may, without overstepping the limitations of nature, please our patron, give him full stamp of individuality, and perfectly portray his character in his features.

For people who have low foreheads, projecting eyes and decided jawbones we must draw the curtain to the side and diminish the source of light from that direction and give the preponderance to the upper light—that is, judiciously manage the ratio of the side and top lights. In dealing with fleshy countenances we must shield off both front and upper lights, to give precedence to the side light.

A stout face is rendered less fleshy by bringing the camera near the subject, and a thin face may be broadened somewhat by removing the camera.

A portrait of a stout lady should always be taken standing. If the neck is short, as is generally the case, incline the body somewhat forward. Of course this will necessitate the subject to lean her forearm upon a chair or other support. The head is thus thrown in front of the shoulders and the face is raised and the neck apparently lengthened and at the same time the shoulders and bust are made to look less bulky.

Sometimes we have diminutive subjects who are sensitive as to their Liliputian dimensions. Of course no trouble arises if a mere bust is desired, but when a genre picture is attempted some standard of height in the scene—as for instance a chair—will betray the little Zaccheus we have before the lens.

Dr. Vogel mentions a subject who came to him complaining that in all the pictures which had been taken of her she looked so very small, and she thought photography had no right to claim artistic qualities. The doctor placed the little woman alongside a toy table, threw drapery over it, took a plain background and made a three-quarter length picture, from the knees up. The effect delighted the lady, who declared that Dr. Vogel was the greatest photographer in the world.

Another artist was called upon by a couple, the husband small, the wife very large. The husband naturally wanted to look the size of his partner. The operator placed the man on a footstool, took a three-quarter length and delighted the man, who for once got equal with his wife.

ON THE CAUSE OF BRIGHTNESS IN WELSBACH MANTLES

A NUMBER of theories have been proposed to account for the incandescent properties of mantles, all of which have their adherents and dissenters. The more cautious state the phenomenon as being a property, and go no further. There are others, however, who claim a catalytic action, or say it is simply due to high temperature, or a phase of combustion, and so on, until the humble student scarcely knows whether he really knows what he does know.

And then, again, it is claimed that the incandescent oxides possess the property of altering the wave length of light, a theory advanced first by Nichols and Snow to explain the incandescence of oxide of zinc. Le Chatelier and O. Boudard, in the "Comptes Rendus," have lately given the results of their investigations in this direction, claiming that the light is confined principally to the region of the spectrum, *i. e.*, between red and blue, the luminous yield varying with the color and the temperature. In experimenting with various substances, by placing them upon the electric pyrometer in the flame, and comparing the results obtained with the luminous intensity of melting platinum, they obtained the following results:

Incandescent substance.	Temperature Deg. Cent.	Realative luminous intensity— Red.	Green.	Blue.
Platinum.....	1,290	0.085	0.040	0.044
Ferric oxide.....	1,080	0.015	0.0048	0.001
Auer mantle.....	1,380	0.070	0.125	0.125
Thorium oxide.....	1,290	0.0145	0.014	0.003
Cerium oxide.....	1,110	0.019	0.007	0.015
Uranium oxide.....	1,070	0.003	0.0015	0.0005
Lanthanum oxide ...	1,250	0.040	0.031	0.018

These temperatures are much below those sometimes claimed, Bunte, for example, claiming about 2000° Cent. The authors state that at a given temperature the brilliancy is the same whether the incandescent substance is heated in the burning gases or in the hot gases already burned. The temperature required for incandescence is not much above that of the incandescent particles in an ordinary gas flame, or in round numbers, about

1,650° Cent. (3,000° Fah.) To determine this temperature, the light from an Auer mantle was compared with a portion of the same material placed on the couple of the electric pyrometer. The following were the results obtained :

Material.	Temperature Deg. Cent.	Relative luminous intensity— Red.	Green.	Blue.
Mantle	to be found.	0.23	0.42	0.41
Coating on thermo-couple.....	1,100	0.0023	0.0017	0.0013
	1,300	0.019	0.031	0.020
	1,500	0.140	0.280	0.170
	1,700	0.350	0.780	0.400

By comparison, therefore, it will be seen that the temperature of the mantle must have varied between 1,590° C. and 1,710° C., depending upon the color of radiation utilised. They conclude as follows: "The mantle is composed of a material of which the emissive power at its working temperature differs for its different radiations, and is, hence, at least at this temperature, what is called a colored body. Its good yield results from its great emissive power being in the neighborhood of unity near blue, green, and yellow, and much less for red, and probably still less for infra red. The proportion of radiated energy which is visible is, therefore, very great."—*The Optician and Photographic Trades Review.*

THE FINE ARTS AND PHOTOGRAPHY

THE very fine collection of photographs now (January 4th to 14th) on exhibition in the rooms of the Boston Camera Club, 50 Bromfield Street, reflects great honor upon the members of the Photographic Society of Philadelphia, and affords a fitting opportunity for some observations upon the present state of photography as seen in this and similar exhibitions. It must be recognized, even by those who are in the habit of thinking of photography as a purely mechanical process of picture manufacture, that, under the fresh impulse of the amateur movement within the past decade, results have been obtained that are sufficiently wonderful to command the respect which is due to a serious art. This extraordinary development of photography—which was almost wholly mechanical a few years ago, and

undoubtedly is so still in the case of vast numbers of matter-of-fact practitioners—has come about chiefly through the application of imagination and taste. It is not so much a matter of lenses, of toning, of printing, etc., as of the introduction of a little personal sentiment, insight and enthusiasm, which of themselves are the leaven that leaveneth the whole lump, turning what is a process into an art, were that process nothing more than the making of a hairpin.

In all the series of remarkable exhibitions held by the Boston Camera Club in the past four or five years, there has been no better exhibition than that which the Philadelphians are now giving here. There is an individuality about much of the work that stamps it with a distinct and original character. The landscapes taken in Pennsylvania and adjoining States have a certain charm of novelty to us of New England, and it is to be said of them in general that they give a noble and beautiful impression of the rich scenery of the Middle States, with their amplitude of spaces, their bland and generous expanses, the grandeur of their mountain ranges and the inexhaustible picturesque loveliness of their great rivers.

To descend to a detail which smacks of the shop, but which has its importance, let us remark that the pictures which are framed (and particularly those which are framed in narrow dead black wood frames, without borders or mats) appear to so much better advantage than their neighbors that it is worth considering whether it would not be feasible before long to make a regulation respecting this matter for general exhibitions. A good photograph is worthy of a proper frame. Why show it in déshabillé? —*Boston Transcript, Friday, January 6, 1899.*

LITERARY NOTES

In Nature's Image.—It is refreshing, a positive treat to read such a work as Mr. Adams has prepared. His intimate acquaintance with the best writers on photographic subjects has enabled him to present some of the most interesting as well as instructive information on the topics of landscape and figures, figures, genre, story telling, photographic models, home portraiture, child photography, floral work and architecture contributed by the shining lights in photographic literature.

The superb illustrations which have enlisted the highest resources of photographic embellishment in their production are in themselves works of art and demonstrate the right of photography to a claim in the rank and file of art.

The new photography is well represented by the leading spirits of this novel differentiation of the art. While the shining lights of the old school have such exponents as H. P. Robinson, Falk, Ryder and others.

It would seem impossible to add anything more to such excellence, but the work is a model of typographic art in addition and the decorative binding is even more attractive than Sunlight and Shadow.—*W. I. Lincoln Adams.—The Scovill & Adams Co., N. Y.*

From the same publishers we receive another tastefully ornamented book, "Photographic Amusements," by Walter E. Woodbury, editor of the Photographic Times.

Though not intended as a book of instruction and presupposing a knowledge of the technical part of photography, it is so clearly and straightforwardly written that an intelligent beginner though but little acquainted with the science, could readily understand the processes described and no one could read it without obtaining a considerable amount of scientific information about the phenomona of light, while being delighted with the novelty and marvellousness of the effects given in illustration.

The author very modestly says:

> "I have gathered me a nosegay of other men's flowers,
> Nothing but the thread which binds them is my own."

But we would say "there is an originality of selection as well as of invention and the method of presentation is of great value in the promulgation of knowledge.

The first number of the Photo-Miniature is at hand. A magazine of photographic information edited by John A. Tennant and published by Tennant & Ward, 289 Fourth Avenue, New York.

The Photo-Minature is a novel departure in photographic literature and covers a much needed field of usefulness, to which the amateur may have resource when in a dilemma, for accurate information within his capacity. The first number (March) on Modern Lenses, is a sign post of what the subsequent copies shall be like.

The most important topic, lenses, a subject about which there is

so little literature really adaptable to the amateurs wants, is treated in a clear comprehensive manner showing in the writer a thorough familiarity with all the details of this difficult subject. He needs no array of words or phrases copied out of works on optics to hide imperfectly conceived ideas. He knows all about lenses up-to-date and he is not afraid to talk about them in familiar phraseology which any intelligent reader may readily understand.

We receive very many books having merit, but it is impossible to preserve them all. However the Photo-Minature is so good in this first number and the indications are favorable that the subsequent issues, each of which is to take up a special topic, will equal it, that we have reserved it a place in our photographic library and feel assured that the twelve numbers will make one of the most interesting books on our shelves. A special series of fine illustrations will be presented each month.

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From the Nepera Chemical Co. comes a very attractive little book illustrating the wonderful advance in the facilities for supplying the greatly increased demand for velox paper. The modest dimensions of the factory six years ago are pictorially contrasted with the gigantic proportions of the buildings now necessary for its manufacture. This alone is evidence that it is a good thing—and has come to stay.—Send for the pretty little book with its numerous charming vignettes; and by the way we are glad to see that the company has such an excellent demonstrator as our old friend Mr. Alfred Maris, who is doing much to make the velox paper popular here by his successful demonstrations of its merits.

Bird-Lore (The Macmillan Co.) for April contains a letter from Governor Roosevelt urging the importance of protecting our birds, which shows the writer to be a genuine bird-lover and thoroughly conversant with his subject. The same number also contains contributions from Annie Trumbull Slosson, Florence A. Merriam, Ernest Seton Thompson, Frank M. Chapman, and others, and there are some remarkable photographs of wild birds from nature.

NEWS ITEMS

Dekko Paper.—Dekko paper is a variety of bromide paper introduced by the Eastman Kodak Co., which differs from the ordinary bromide paper in the peculiarity that, though printed by gas light, it may be handled and developed by subdued day light or even strong gas light, therefore needing no dark room and giving the excellent opportunity of judging of color of the print by pure white light. The development is rapid and a variety of charming tones are attainable by modification merely of exposure and development. The Messrs. Eastman kindly supplied us with a number of samples of the different varieties of the papers—carbon matte, eggshell matte, plain matte and rough matte.

We are delighted with the beauty of the results secured; the ease of manipulation and the general artistic effect of the prints. We obtained black, brown, sepia, purple and even bartolozzi red, resembling very closely carbon work and recommend the paper to those who have not the necessary skill to make either carbon or platinum work, inasmuch as the Dekko paper with the expenditure of a little care and cleanliness of manipulation will give results as delightful.

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Whether it is a new agent we are not in position to say but it does certainly act in the manner claimed for it and in addition is most convenient for use, being put up in neat gelatine capsules, whereby all risk of breakage is avoided. It is the developer for those who go on photographic trips as it is easily preserved and ready in a moment for active operations. We were much pleased with the development we effected by its means and can heartily recommend it to all amateurs and professionals.

CONVENTION DATES

Iowa Convention :
Des Moines, Iowa, May 23rd, 24th, 25th
Secretary, W. O. Reed, Missouri Valley, Ia.

National Convention :
Celoron, Chautauqua, July 17th to 22nd.
Secretary, George B. Sperry

Missouri Convention :
St. Louis, Mo., August 22nd, 23ad, and 24th.
Secretary, A. S. Robertson, St. Louis, Mo.

Ohio Association :
Put-In-Bay, O., August 30th and 31st, September 1st.
Secretary, C. S. Bateham, Norwalk, O.

Editors American Journal of Photography:

GENTLEMEN :—The Photographers Association of Iowa invite the professional photographers of other states, and amateurs generally to make exhibits at our next convention which will be held in Des Moines on the following dates : May 23, 24th, 25th, 1899. The following special classes are open to them :

SPECIAL. Professional photographers outside of Iowa. Six pictures, no restriction as to size. Gold medal for best exhibit. Fee, $1.00.

SPECIAL. Amateur photographers. Open to the world. Not less than six nor more than twelve pictures. No restriction as to size. Three or more exhibits must be entered in competition to entitle any one to the prize. 1st. Silver Medal. 2nd. Special Diploma. Fee, $1.00.

Applications accompanied by entrance fee should be made to the Secretary at least fifteen days before opening of the convention. Exhibits should be shipped to J. C. Wilson, Vice-Pres. P. A. of I., Des Moines, Iowa, in time to reach there May 20th. Covers to shipping cases must be screwed on. Charges must be prepaid. W. O. REED, *Sec'y*, Missouri Valley, Iowa.

Manuel Pratique d'Heliogravure en Taille-Douce, by M. Schiltz Gauthier Villars.

This little work is doubtlessly intended for amateurs, judging from its style. It describes in a simple way the making of Heliogravures. The original plan is given whereby a polished copper plate is covered with a suitable dust grain followed by a coating of a mixture of gelatine and bi-chromate of potassa which is employed in an impression from a positive which is afterwards etched.

The book is valuable for the practical and thorough method with which it gives hints on all steps of the process. The writer is evidently a practical man and knows whereof he writes from experience.

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"HURRY-UP PHOTOGRAPHY"

A VERY interesting demonstration was given the other evening before the Photographic Art Club of San Francisco, by Mr. Rea, the president, in the way of "hurry-up" photography.

He handled the subject in a manner that showed that he was accustomed to his work. In this case he endeavored to set a record for the quickest time possible to show a proof, and it will take some pretty lively work to excel his performance. Nine minutes after the plate had been exposed he displayed a proof! While the club members had been led to look for some extraordinary feat, the celerity with which Mr. Rea brought about results made many of them gasp with astonishment. Mr. Rea first placed on the table five trays. The first one at the left contained developer for the plate; then came the fixing bath. The third held water, the fourth Velox developer, and fixing solution filled the last tray. A gentleman was selected from the spectators to act as "model" and a flashlight view of him was secured. Immediately lights were turned out, and Mr. Rea proceeded to "hustle." The plate was placed in the developer, rocked to and fro, and every few moments hastily inspected. The painful stillness in the club-room was a manifestation of the intense interest displayed in the demonstration. In a short time the development was declared sufficient and rocking was continued in tray No. 2. After fixing the plate it was washed in running water for but a minute, when it was transferred, face up, to the tray of water, and a sheet of Velox paper placed in the water, face down. The two were then lifted together, and a piece of blotting paper passed over the back so as to rub off all excess fluid. Mr. Rea stated that the Velox paper required twice the usual time of exposure when wet. He then held it up to a lighted gas jet, and when given the proper exposure it was plunged into the developer, and when the image came to the required clearness it was transferred to the fixing bath. After allowing the print to fix for a few moments the lights were turned up and the time taken. The watches said "nine minutes."

Mr. Rea would like to have record-breakers come forward, for he feels that as the pace has been set it will be difficult to lower his time.